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Collision Avoidance System for Vehicles Using Microcontroller

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ABSTRACT: In the past, man took days to travel from one place to another. As the years gone by man became more innovative, the discovery of wheel is the simple example. With this wheel he began to travel faster. If we look into modern days we will come to know that as the number of working persons are increasing day by day the number of vehicles are increasing in the same fashion. The number of accidents is occurring because of negligence and avoidance. Thus we have designed the system in such a fashion which will help us in overcoming those shorts of problem. Here we are making use of a transmitter which is a transduction element which emits pulses at a frequency of 40 kHz which is being sensed by the receiver and finally given to the microcontroller which will take the appropriate decision depending upon the obstacle. If the obstacle will approach from left side then it will inform the person to take right and if it is coming from right then it will tell the person to take left side. In this way we can avoid the number of accidents by giving appropriate information to the person sitting inside the vehicle.

KEYWORDS: 89C51 Microcontroller, APR9600 Chip, Bistable Multivibrator, Comparator, Ripple Counter

I. INTRODUCTION

Until well into the twentieth century, to the position of the object we used the principle of comparison of measured distance with that of the known standard unit of length. Other means are also available. One of these is the measurement of the time taken by a sound wave to cover certain distance. The sound normally lies beyond human hearing. In our ultrasonic is used to find the position of the object within a range of 21cm to 31 cm and microcontroller is used to detect whether the object is at right or left. This consist of four major blocks: 1) A sender.2) A receiver.3) Timing and Time preference Section and 4) The speaker. The transduction element emits bursts of 12 pulses at a frequency of about 40 KHz. This frequency is roughly identical with the resonance frequency of the two transducers, so that some sort of selectivity is obtained at the sensing element. As soon as the first burst id emitted a bistable is actuated which enables the counter. Immediately after the burst has been emitted, the unit is switched to reception. The sensitivity of the receiver is a function of time. During and immediately after emission of the burst, the sensitivity is low. Crosstalk between the transduction and sensing element has, therefore, no effect on the operation of the unit. If an echo is received very soon after the emission of burst, it will be sufficiently strong to be processed by the receiver in spite of very low sensitivity. An echo that takes a longer time to reach the sensing element will be weaker, but by then the sensitivity of the receiver has become higher. The upshot of this arrangement is that reliable measurements, unaffected by spurious reflections and crosstalk, may be made with relatively simple means. At the instant echo is sensed, the bistable is reset and the counter stage is latched. Since the clock frequency is 17.05 KHz and the velocity of the sound under normal atmospheric condition may be taken as 342m/sec, the period of clock is equal to the time taken by the burst to travel 2cm i.e 1cm forward and 1 cm back. This means that the number of clock pulses counted between the onset emission of the burst and the sensing of the echo is equal to the number of centimeters between the transducers and the reflecting surface. Once the object is sensed the microcontroller performs the task of knowing whether the object is at right or left. If the object is at right then it will display the message to go left and announces the same using the speaker. If the object is at left then it will display the message to go right and announces the same using the speaker.

LITERATURE SURVEY

A major fork marks evolution of microprocessor and microcontroller technology. One branch of evolutionary tree is represented by Pentium chips and power PC Chips, which form the heart of personal computers. This branch is focused upon enhancing raw computing power. Microcontroller represents the other branch, which is thirty times larger in unit volume. The basic ideas of the project came when the maruthi agency gave the advertisements in television, smart phones and newspaper and invested crores of rupees to prevent the accidents. Then we thought of designing a system

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that would aid the driver so that it detects any obstacle and inform the driver at appropriate time so that he can take necessary action.

II. IC DESCRIPTION

2.1 89C51 Microcontroller:

Computer in its simplest from needs at least three basic blocks: the central processing unit (CPU), Input-output (I/O) and memory (RAM/ROM).The integrated form of CPU is the microprocessor. As the use of Microprocessor in control application increased, development of microcontroller unit or MCU took shape, wherein CPU, I/O and some limited memory on a single chip was fabricated. Intention was to reduce the chip count as much as possible. There are many types of microcontrollers currently in the market, out of which the 8031 which is the family from Intel, and second sourced by many others, have gained immense popularity.

2.1.1 Introduction:

Looking back at the history of microcomputers, one would at first come across the development of microprocessor i.e., the processing element, and later on the peripheral devices. The three basic elements-the CPU, I/O devices and memory- have developed in distinct direction. While the CPU has been the proprietary item, the memory devices fall into general purpose category and the I/O devices may be grouped somewhere in between. The control application of microprocessors have different requirement, both hardware-wise as well as software wise. Whereas microprocessor has just sufficient number of on-chip devices to act as the CPU, a number of other auxiliary devices are needed to get a working microcontroller. Integration of I/O and memory with the CPU on a single Chip ushered in the era of development of a new class of devices…i.e., the single chip microcontrollers. Now only one device was needed to run an independent control application. The 8048 from Intel, Z80 from Zilog, 6805 and 6811 from Motorola represent a few of the members of this large family. The 8048 from Intel became popular due to its use in the keyboard of the IBM PC.The family of second generation microcontrollers from Intel, the 8051 and other related devices, has brought about a new revolution in this field. While the early microcontrollers had only limited memory and existent serial I/O capability, the 8051 provides for 4k PROM/ROM, 128 byte RAM and 32 I/O lines. It also includes a universal asynchronous receive-transmit (UART).Device, two 16-bit timer counter and elaborate Interrupt logic. Lack of multiply and divide instruction, has also been taken care of in the 8051.Thus the 8051 may be called nearly equivalent of the following devices on a single chip:
8085+8255+8251+8253+2764+2764+6116.
(Microprocessor)(PPI)(USART)(TIMER)(EPROM)(RAM)

In short, the 8051 has the following on-chip facilities:

- 4k ROM (EPROM on 8751).
- 128 byte RAM.
- USRT.
- 32-bit input-output port lines.
- TWO 16-bit timer/count.
- Six interrupt sources and
- On-chip clock oscillator and power-on reset circuitry.

The other members of this family, such as 8053, have one extra timer/counter, 8k ROM/EPROM
And 256 byte RAM, while 8031 and 8032 are corresponding ROM-less version of 8052, respectively. All these are also available in CMOS versions. The 8051 family includes a large numbers of members from many manufacturers, some of which are listed below.

8051 with 4k ROM and its.
8751 with 4k EPROM.
8031 with ROM – fewer versions.
8052 with 8k ROM, one additional counter/timer and 256-bit RAM; it's other versions (8052h)
Comes with built-in basic interpreter .8032 and 8752 are ROM +I/O (80C31) along with pulse width modulation.80C592 with 8-channel A/D converter.

2.1.2 Salient Features:

The 8051 can be configured to bypass the internal 4k RAM and run solely with external program memory. For this its external access () pin 31 has to be grounded, which makes it equivalent to 8031.The program store enable (PSEN) signal acts as read pulse for program memory. The data memory is external only and a separate RD* signal is available

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for reading its contents. Use of external memory requires that three of its 8-bit port (out of four) are configured to provide data/address multiplexed bus, Hi address bus and control signal related to external memory use. The RXD and TXD ports of UART also appear on pins 10 and 11 of 8051 and 8031 respectively. One 8-bit port, which is bit addressable and extremely useful for control applications, still remains free for use. The UART utilizes one of the internal timers for generation of baud rate. The crystal used for generation of CPU clock has therefore to be chosen carefully. The 3.579MHz crystal; available abundantly, can provide a baud rate of 1200. The 256-byte address space is utilized by the internal RAM and special function registers (SFRs) array which is separate from external RAM space of 64k.The 00-7Fspace is occupied by the RAM and the 80-FF space by the special Function Registers (SFR).The 128-byte internal RAM has been utilized in the following fashion:

00-1F: Used for four banks of 8 registersof 8-bit each. The four banks may be selected by software any time during the program.
20-2F: The 16 bytes may be used as 128 bits oriented programs.
30-7F: This area is used for temporary storage, pointers and stack. On reset, the stack starts at 08 and gets incremented during use.

2.1.3 Hardware Details:

The on-chip oscillator of 8031 can be used to generate system clock. Depending upon version of the device, crystal from 3.5 to 12 MHz may be used for this purpose. The system clock is internally divided by 6 and the resultant time period becomes one processor cycle. The instructions takes mostly one or two processor cycles. The ALE pulse rate is $1/6^{th}$ of the system clock, except during accessof internal program memory, and thus can be used for timing purposes. The two internal timers are wired to the system clock and persecuting factor is decided by the software apart from the count stored in the two bytes of the timer control registers. One of the counters, as mentioned earlier, is used for generation of baud rate clock for the UART. It would be of interest to point out that the 8052 has a third timer which is used for the generation of baud rate. The reset input is normally low and taking it high reset the microcontroller. In the present hardware, a separate CMOS circuit has been used for generation of reset signal so that it could be used to drive external devices as well.

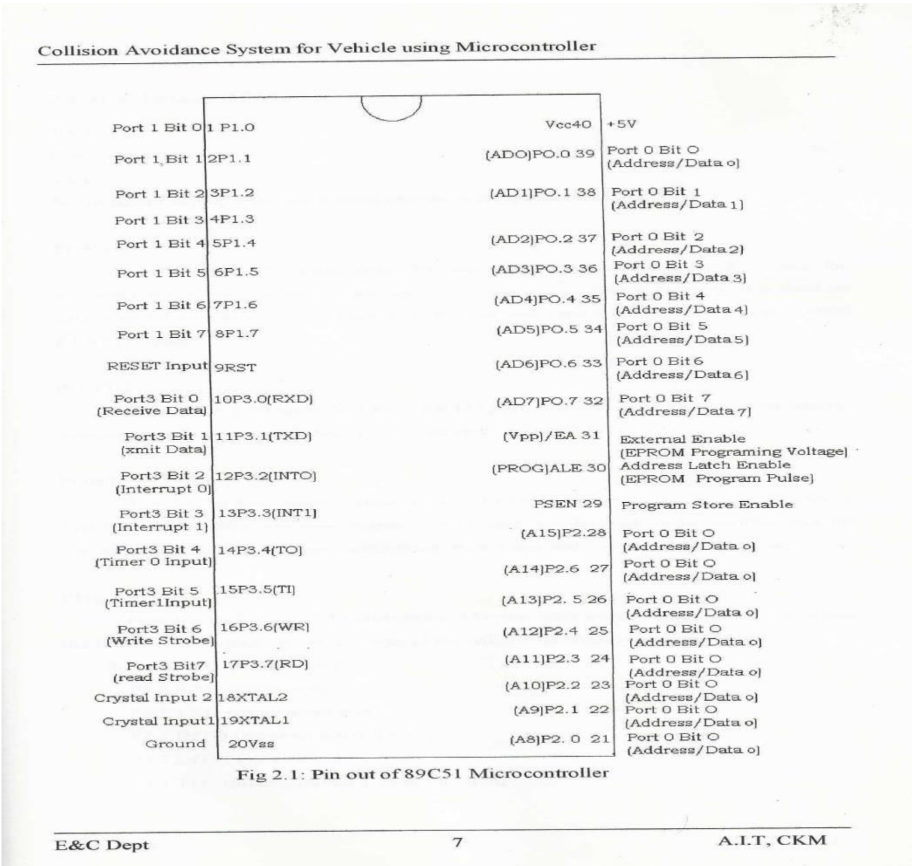

Fig 2.1 Pin out Diagram of 89C51 Microcontroller

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2.1.4 Pin Details of 89C51:
VSS:
Circuit Ground Potential.
VCC:
5-volt power supply input for normal operation and program verification.
PORT 0:
Port 0 is an 8-bit open drain Bi-directional input-output port. It is also the multiplexed low ordered address and data bus when using external memory. It is used for data output during program verification Port0 can sink (and in bus operation can source) 8 LSTTL loads.
PORT 1:
Port 1 is an 8-bit quasi bi-directional I/O port. It is also used for low order address byte during program verification. Port 1 can sink/source 4 TSTTL Loads.
PORT 2:
Port 2 is an 8 bit quasi bi-directional I/O port. It also emits the higher order address byte when according external memory. It is used for the higher order address and the control signals during program verification. Port 2 can sink/source 4 LSTTL Loads.
PORT 3:
Port 3 is an 8 bit quasi bi-directional I/O port with internal pull-ups. It also serves the function of various special features of the MCS-51st. family as listed below:
Port pin Alternate function
P3.0 RXD (Serial Input Port).
P3.1 TXD (Serial Input Port).
P3.2 INTO (external Interrupt).
P3.3 INT1 (external Interrupt).
P3.4 TO (timer/counter 1external input).
P3.5 T1 (timer/counter 1external input).
P3.6 WR (external data memory write strobe).
P3.7 RD (external data memory read strobe).
The output latch corresponding to a secondary function must be programmed to a one (1) for that function to operate. Port 3 can sink/source 4 LSTTL Loads.

RST:
A high on this pin for two-machine cycle while the oscillator is running rests the device. A small external pull down resistor (=8.2KOhms) from RST to VSS permits power on reset when a capacitor (=10micro farad) is also connected from this pin to VCC.
ALE:
Address latch enable output for latching of the lower byte during access to external memory. ALE is activated at a constant rate of 1/6th oscillator frequency except during an external data memory access at which time one ALE pulse is skipped. ALE can sink/source 8 LSTTL inputs.
PSEN:
The program store enable output for latching the lower byte during access to external memory six oscillator periods except during external data memory access PSEN remains high during internal program memory. Do not float EA during normal operation.
XTAL1:
Input to the inverting amplifier that forms the part of the oscillator and input to the internal clock generator.XTAL2 receives the oscillator signal when an external oscillator used.
XTAL 2:
Output of the inverting amplifier that forms the part of the oscillator and input to the internal clock generator.XTAL2 receives the oscillator signal when an external oscillator used.

2.2 APR9600:
2.2.1 Introduction:
APR 9600 is a low-cost high performance sound record /replay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. The replayed sound exhibits high quality with a low-noise level. Sampling rate for a 60 second recording period is 4.2 kHz that gives a sound record/replay bandwidth of 20Hz to 2.1KHz.However, by changing an oscillator resistor, a sampling rate as high as 8

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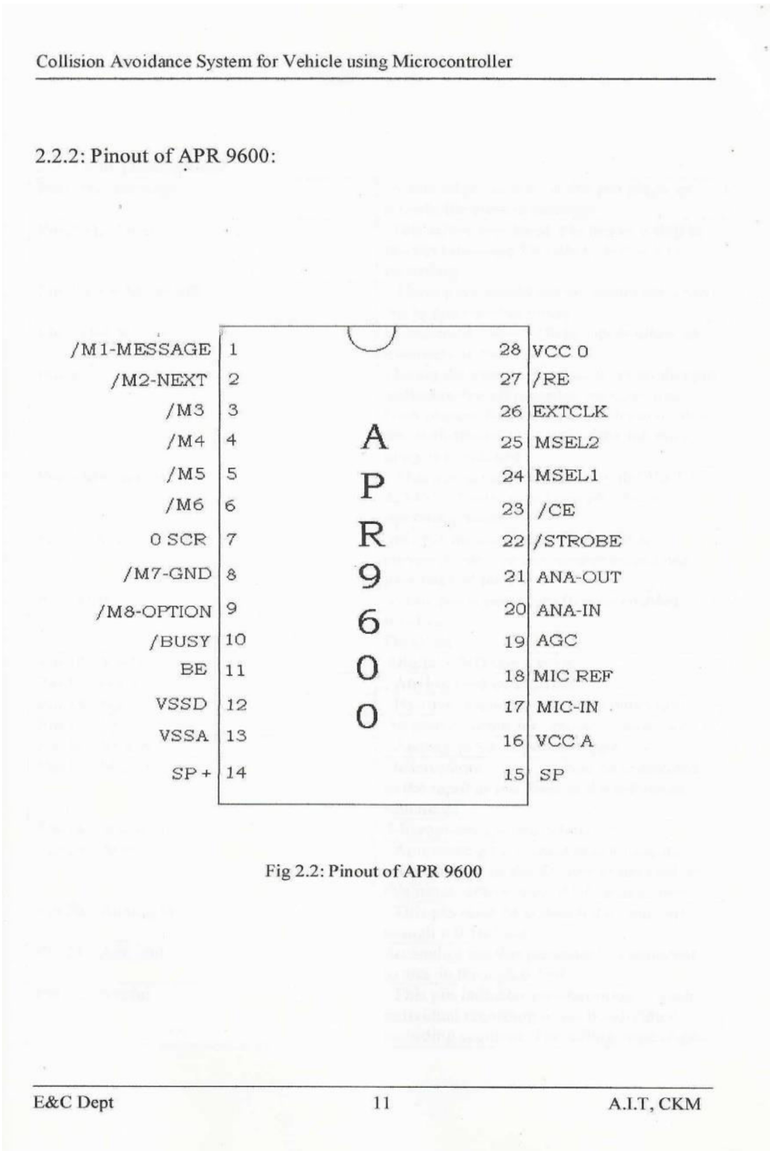
KHz can be achieved. This shortens the total length of sound recording to 32 seconds. Total sound recording time can be varied from 32 seconds to 60 seconds by changing the value of the single resistor. The IC can operate in one of the two modes: serial mode and parallel mode. In serial access mode, sound can be recorded in 256 sections. In parallel access mode, sound can be recorded in 2, 4 or 8 sections. The IC can be controlled simply using push button keys. It is also possible to control the IC using external digital circuitry such as micro-controllers and computers. The APR 9600 has a 28 pin DIP package. Supply voltage is between 4.5 to 6.5V.During recording and replaying, current consumption is 25mA.In idle mode, the current drops to 1mA.

2.2.2:
Pin out of APR 9600:


Collision Avoidance System for Vehicle using Microcontroller

2.2.2: Pinout of APR 9600:

Fig 2.2: Pinout of APR 9600

E&C Dept 11 A.I.T, CKM

Fig2.2: Pinout of APR 9600

2.2.3 Pin Description:

Pin1: M1_message	:A low edge on this pin plays or records the current message
Pin2:M2_next	: This active low input pin forces a skip to the next message for either playback or recording.

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Pin3,4,5,6: M3 to M8	: These pins should not be connected when the input is in auto rewind mode.
Pin7:OSCR	Oscillator Resistor: These input allows an external oscillation.
Pin8:	During the playback a low-level on this pin indicates that all recorded message has been played. Recording a low level on this pin indicates that the end of the memory array has reached.
Pin9:M8_option	: This pin in conjunction on with MSEL 1 and MSEL 2 sets record and playback operating mode.
Pin10:busy	: This pin indicates that the device is currently busy and can neither record nor playback at the current time.
Pin 11:BE	: If this pin is pull high, BE's is enabled it is low, Disabled.
Pin 12:VssD	: Digital GND Connection.
Pin 13:VssA	: Analog Gnd Connection.
Pin 14:Spt	: Positive output for speaker connection.
Pin 15:Sp-	: Negative output for speaker connection.
Pin 16:VccA	: Analog positive power supply.
Pin 17:Mic in	: Microphone input: should be connected to the input as output lined in the reference schematic.
Pin 18: Mic in	: Microphone ground reference.
Pin 19: AGC	: Automatic gain control attack time the time constant of the RC n/w connected to this input determined AGC attack time.
Pin 20:Analog in	: This pin must be connected to ana_out through a 0.1mf capacitor.
Pin 21: Ana_out	: An ana_out in this pin must be connected to ana_in through 0.1 mf.
Pin 22: Strobe	: This pin indicates programming of each individual recording of each individual recording segment. The falling edge reigns the beginning of sector and raising edge and sector is half full.
Pin 23:Chip Enable	: A low level in this pin enables the device for operation.
Pin 24: MSEL 1: Mode select1	: This pin in conjunction with MSEC 2 & M8 option sets record and play back operation mode.
Pin 25: MSEC 2	: This pin in conjunction with MSEC1 & M8-option sets record and play back operation mode.
Pin 26: Ext clk: External clock	: This clock can be used instead of the internal clock for greater programming control and accuracy. When using the internal clock, this pin should be grounded.
Pin 27:Recorded Enable	: This pin controls whether the device is in write or read mode. Logic high is read.
Pin 28:VccD Tape mode using auto rewind option	

Table 2.1 Pin description of APR 9600

III. BLOCK DIAGRAM AND DESCRIPTION

The essential elements of the collision avoidance system are shown in block diagram below

- Microcontroller.

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- Voice Recorder IC (APR 9600)/LCD.
- Bistable Multivibrator.
- Comparator.
- Ripple Counter.

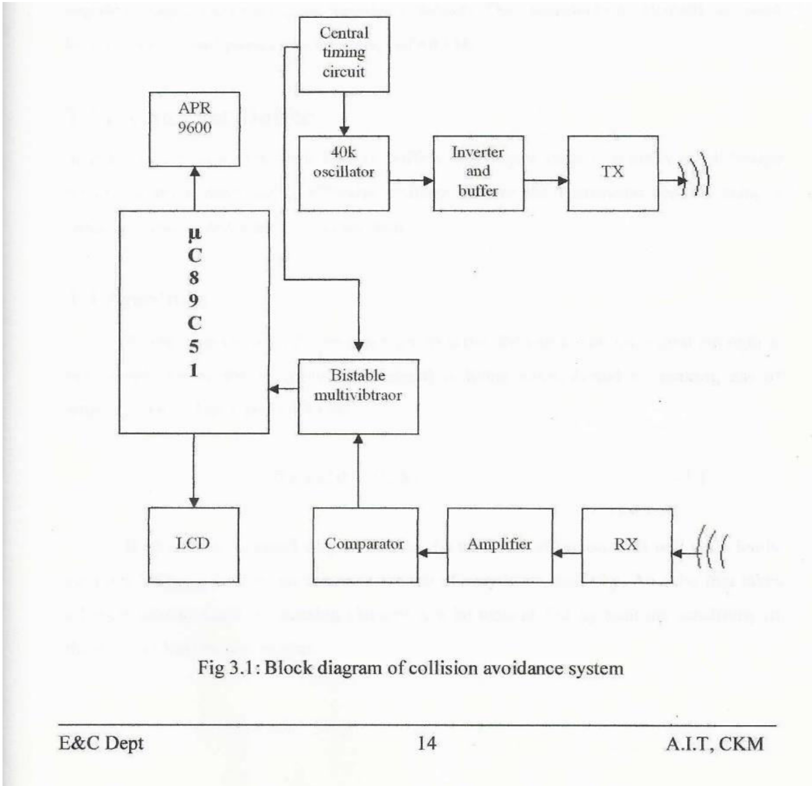

Fig 3.1 Block Diagram of Collision avoidance system.

3.1 Central Timing Circuit:
Here we are making use of a central timing circuit which is used for triggering both 40 kHz oscillator and bistable-Multivibrator simultaneously. This is provided by IC 4060 when the switch is pressed the output goes high twice a second. But since we require continuous operation we have grounded this switch.

3.2 Oscillator:
The 40 kHz oscillator is enabled for about .3 msec using RC network so that the emitted burst from transduction element contain 12 periods of 40 kHzsignal. It is tuned to the resonant frequency of the transducer with the help of potentiometer. The regulated supply voltage ensures adequate frequency stability. The transduction element is used here to emit pulses at a frequency of 40 kHz.

3.3 Inverter and Buffer:
It is being driven by four pair CMOS buffers and the output stage is actually a full-bridge which causes a doubling of effective voltage. Before the transmitter we are using a capacitor which blocks the DC component of the signal.

3.4 Amplifier:
At the receiver part, the receiver use to sense the signal strength as it is very weak during the reception. The signal is being strengthened by making use of amplifier which has a gain of 33dB.

$$20 \log (100k/2.2k)$$

If an echo is received very soon after the emission of the burst, it will sufficiently strong to be processed by the receiver in spite of very low sensitivity. An echo that takes a longer time to reach the sensing element will be weaker, but by then the sensitivity of the receiver has become higher.

3.5 Comparator:
The strengthened signal resulting from the amplifier is given to the comparator which uses to compare the signal with the reference signal which is having the reference voltage of 1V.If the output coming from the amplifier is more than

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that of the reference signal then it will not be passed if it will be stronger then only it will be passed and given to the bistable Multivibrator.

3.6 Bistable Multivibrator:

The bistable Multivibrator plays an important role in the receiver section. Initially, the bistable output is high. The bistable Multivibrator is triggered by the central timing circuit along with the oscillator as they are both present in the single IC 4093.When an echo is sensed the output of the comparator goes low which causes the bistable to reset and this in turn disables the clock to IC's.

At the same time a short negative pulse is applied, which in turn latches the counter state.

3.7 Microcontroller and Display Unit:

Finally a low pulse from the Multivibrator is given to the microcontroller which will take the decision depending upon the obstacle present. The decision taken by it is recorded in APR 9600 in the form of voice message.

The APR 9600 is an IC which has got eight tracks, where each track can store a message of 5 seconds.

The display unit used is LCD here, which will display LEFT_>or RIGHT_>depending upon the decision given by the microcontroller that is left when the object approaches from right and right when it approaches from left.

IV. CIRCUIT DIAGRAM AND DESCRIPTION

4.1 Power Supply:

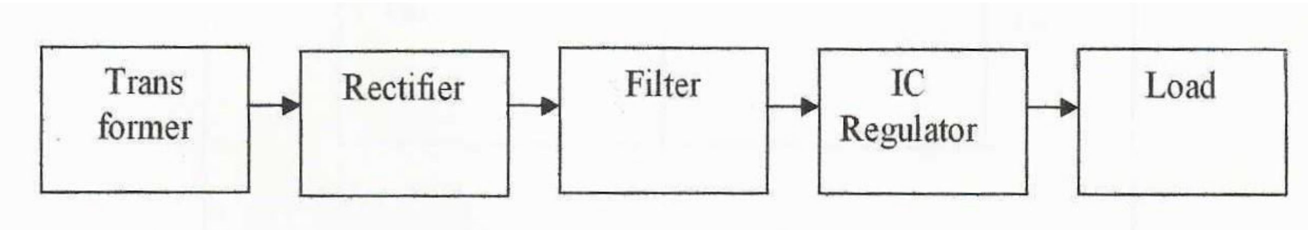
4.1.1 Introduction:

A power supply is an important element of any type of electronic circuit. The successful operation of the circuit depends on the proper functioning of the power supply. The energy meter requires 230V, 50 Hz single phase AC supply for its working. Most of the electronic circuits require a smooth DC voltage as that of batteries. The electronic circuitry used in our project consisting of an APR 9600 and 89C51 requires 5V regulated DC supply. Hence, it becomes essential to design a regulated power supply circuitry to make it work properly.

4.1.2 Block Diagram of Power Supply:

The block diagram of the power supply is as shown in figure (4.1).The AC voltage is connected to a transformer. The transformer steps down the AC voltage to the level required for the desired DC Output. The rectifier converts an AC voltage to a DC voltage. The filter circuit is used after the rectifier to reduce the ripple content in the DC signal to make it smoother. Still then the voltage usually has some ripple or AC voltage variation. This voltage is called as unregulated DC voltage. A regulator circuit is used after the filter, which not only makes the voltage smooth and almost ripple free, but also keep the DC output voltage constant even though input DC voltage varies under certain conditions, aswell. The input to a regulator is an unregulated DC voltage while the output of a regulator is a regulated DC voltage, to which the load is connected.

Fig 4.1 Figure Shown below is the Block Diagram of Power Supply



4.1.3 Voltage Regulator:

The voltage regulator is a circuit which provides a constant voltage regardless of changes in the load currents. In fact after the op-amp, IC voltage regulators are probably most widely used integrated circuit.IC voltage regulators are preferred because of

- Easy to use.
- It greatly simplifies power supply design.
- Due to mass production, low cost.
- They are versatile.
- Conveniently used for local regulation.
- These are provided with features like built in protection, programmable output, current/voltage boosting, internal short circuit limiting etc.

ID voltage regulators are of the following types:

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1) Fixed output voltage regulators.
(Positive and/or negative output voltage).
2) Adjustable output voltage regulators.
(Positive and/or negative output voltage).
3) Switching regulators.
The Circuit diagram for obtaining a constant (+5V) using IC 7805 is as shown in figure(4.2).

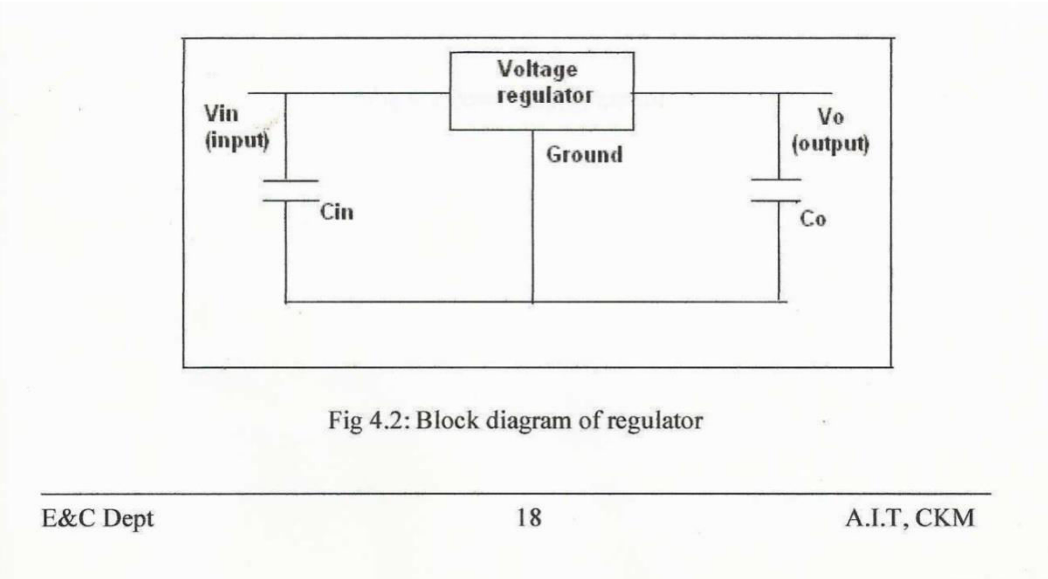

Fig 4.2: Block Diagram of regulator

4.1.4 Circuit Operation:
A 5 V output voltage supply system using full wave bridge rectifier, capacitor filter and IC regulator 7805 is shown in figure(4.3) and the corresponding waveforms are shown in fig(6.4).The AC line voltage is 230 V which is stepped down to 6V using a transformer. A full wave rectifier along with capacitor voltage provides the unregulated voltage input to IC 7805 regulator. The input contains AC ripples of few volts. The IC 7805 regulator provides the regulated output of 5Volts.

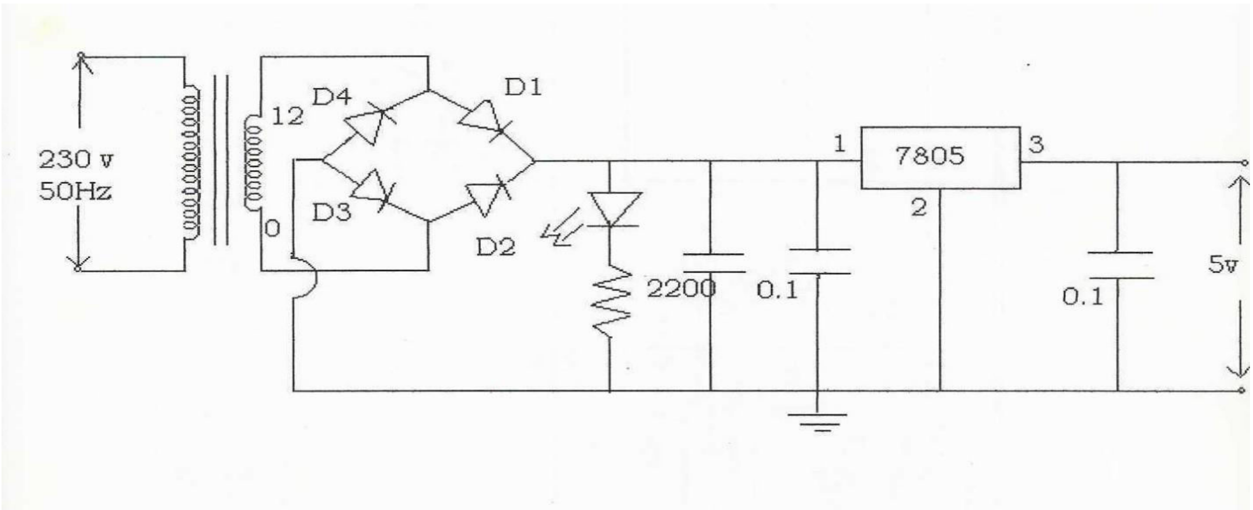

Fig4.3 Power Supply Circuit

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4.2 Circuit Diagram of Collision Avoidance System.

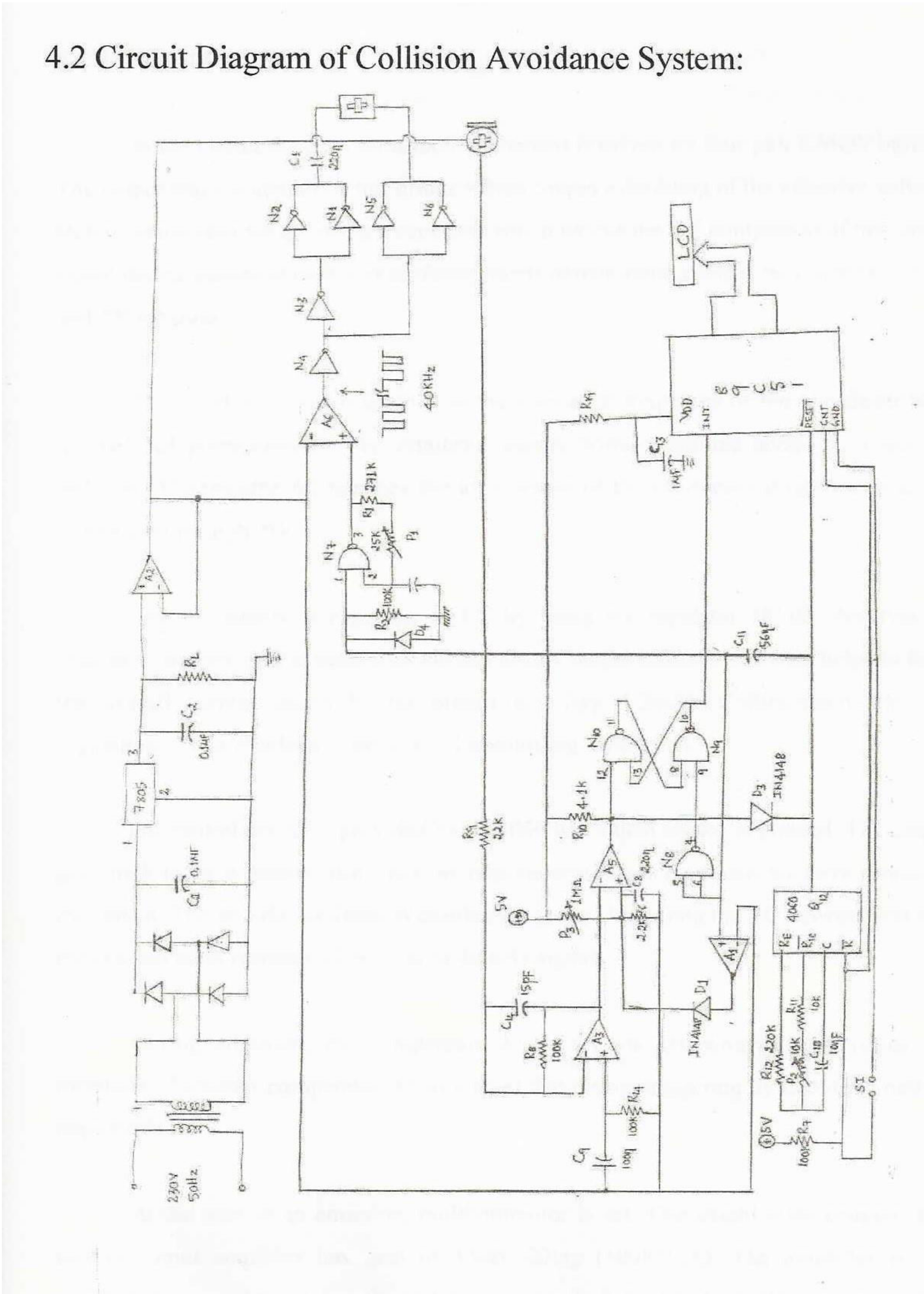

Fig4.4 Circuit Diagram

4.2.1 Description:

In the circuit diagram transduction element is driven by four pair CMOS buffers. The output stage is actually a full bridge which causes a doubling of the effective voltage. Before transmitter we are using a capacitor which blocks the DC component of the output signal during pauses in emission to obtain bursts at maximum energy, two supplies of 9V and 5V are used. The40 kHz oscillator is tuned to the resonance frequency of the transducer with the help of potentiometer. The regulated supply voltage ensures adequate frequency stability. Comparator A6 matches the logic

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level of the oscillators (high=5V) and the output circuit (high=9V).The 9V supply is regulated to 5V by using the regulator 78L05.This type of regulator requires only a small bias current at low output currents and thus help to keep an overall current drawn by the circuit low (type=4.5mA). Unfortunately, the low regulation of this regulator is poor thus good decoupling is required. The central timing is provided by IC 4060 when the switch is pressed. The output goes high twice a second. But since we require continuous operation we have grounded this switch. The 40 kHz oscillator is enabled for about 0.3ms using the RC network so that the emitted burst contains 12 periods of 40 kHz signal. During emission, the comparator A1 is set via D1 which in turn raises the threshold of another comparator A5 to a level that makes triggering by making crosstalk impossible. At the start of emission, Multivibrator is set. This disables the counter. The receiver input amplifier has gain of 33dB, 20 log (100k/2.2k). The amplifier is AC coupled, because the sensing element has a virtually infinitely high DC resistance. The input offset voltage is not amplified. Here offset minimizer resistor is used. A minimum offset voltage at the output is important because it determines the maximum attainable sensitivity. The time dependent sensitivity is realized by A1 lowering the trigger level of A5 via time constant R6-C8. The maximum sensitivity may be matched to the ambient condition by using a pot.P3 (1Mohm).When echo is received, the output of the comparator A5 goes low, which causes the bistable to reset. At the same time a short negative pulse is applied to the microcontroller which results in the transfer of counter state. Here it is necessary to determine whether the object is at right or left, at what distance, i.e. within 21cms to 31cms is determined and necessary information will be announced using speaker and APR 9600 and display it on the LCD.

4.2.2 Accuracy:
The accuracy of the measurement depends on the precision with which time is measured and on the ambient condition. The speed of the sound depends on the atmospheric pressure, the temperature, and the air density. A source of larger errors than caused by atmospheric condition is the unit itself, mainly due to incorrect triggering of the receiver.Partly because of the Q-factor of the sensing element, it takes finite time before the receiver signal attains maximum amplitudeand the receiver is triggered. Each delayed period causes a measuring error of about half a centimeter,

4.2.3 Construction:
Before anything else, make sure that the printed circuit board fits snugly. Note that two corners must to allow the passage of the screws that fastens the front and rare of the case.
Many wired links are required and these should, as a general rule, be soldered in place before any population of the board takes place. Make sure that the LCD is mounted at the correct height to fit snugly in the window provided in the case. The distance between the top of the display and the board must be 25mm. to prevent crosstalk of the LCD drive pulses to the receiver, it is essential to fit a tin or brass screen between the upper row of LCD pins and the transducer. This screen is fitted between the two solder pins provided. A second screen is required to cover the shaded area as it is essential to fit a tin or brass screen between the upper row of the LCD pins and the transducers. This screen is fitted between the two solder pins provided. A second screen is required to cover the shaded area in Fig4. It should be soldered to the first screen near C13, and kept in place with the aid of a few drops of superglue of epoxy resin. The transducer may be fitted on to the solder pins provided on the board or outside the case, for instance, in the bumpers of the cars. On the board, they will be located towards the front of the case, in which 16mm dia. Holes must be drilled. If mounted externally, they are connected to the board by 2 way individually screened cable. If the unit is used in a car, and supplied from the car battery, it is advisable to connect a small choke in series with the supply line to the meter and decouple it with a 100micro farad, 16V capacitor.

4.2.4 Calibration:
A good multimeter is essential is essential, an oscilloscope and/or frequency meter is useful. First the frequency of the 40 kHz oscillator must be matched to the resonant frequency of the transducer. Connect a temporary wire link between pin 1 and 14 of IC2; this will cause the transduction element to operate continuously. Turn P1 fully anticlockwise. Measure the current drawn from the battery with the multimeter and turn P1 slowly clockwise until the current becomes maximum (about16 mA). The oscillator is then set to the current frequency. Note that when P1 is turned further, there is a second current peak, but this is not the required point. This is all assuming that the 4093 used the IC2 position is of SGS or RCA manufacture. The Motorola version has a smaller hysteresis and this may necessitate an increase in the value of C2 to Cn2.The National Semiconductor version, on the other hand, has a higher hysteresis so that the value of C2 may have to be reduced to 470pF.Remove the wire link from pin 1 and 14 IC2. Press S1 and make sure that the transduction element produces a short click twice a second. Next, P2 must be adjusted until the oscillator in IC4 operates at 17.05kHz.In absence of a frequency meter, place the unit in a position where the distance between the front of the transducers and a good reflecting surface, a wall or window is exactly one meter. Press S1 to turn P2 until the display reads 1.00 .If the reading is not stable or just 0.00, turn P3 slightly until a correct stable reading is obtained. Adjustment of P3 depends largely on the circumstances of use. In quite surroundings the control may be set fully

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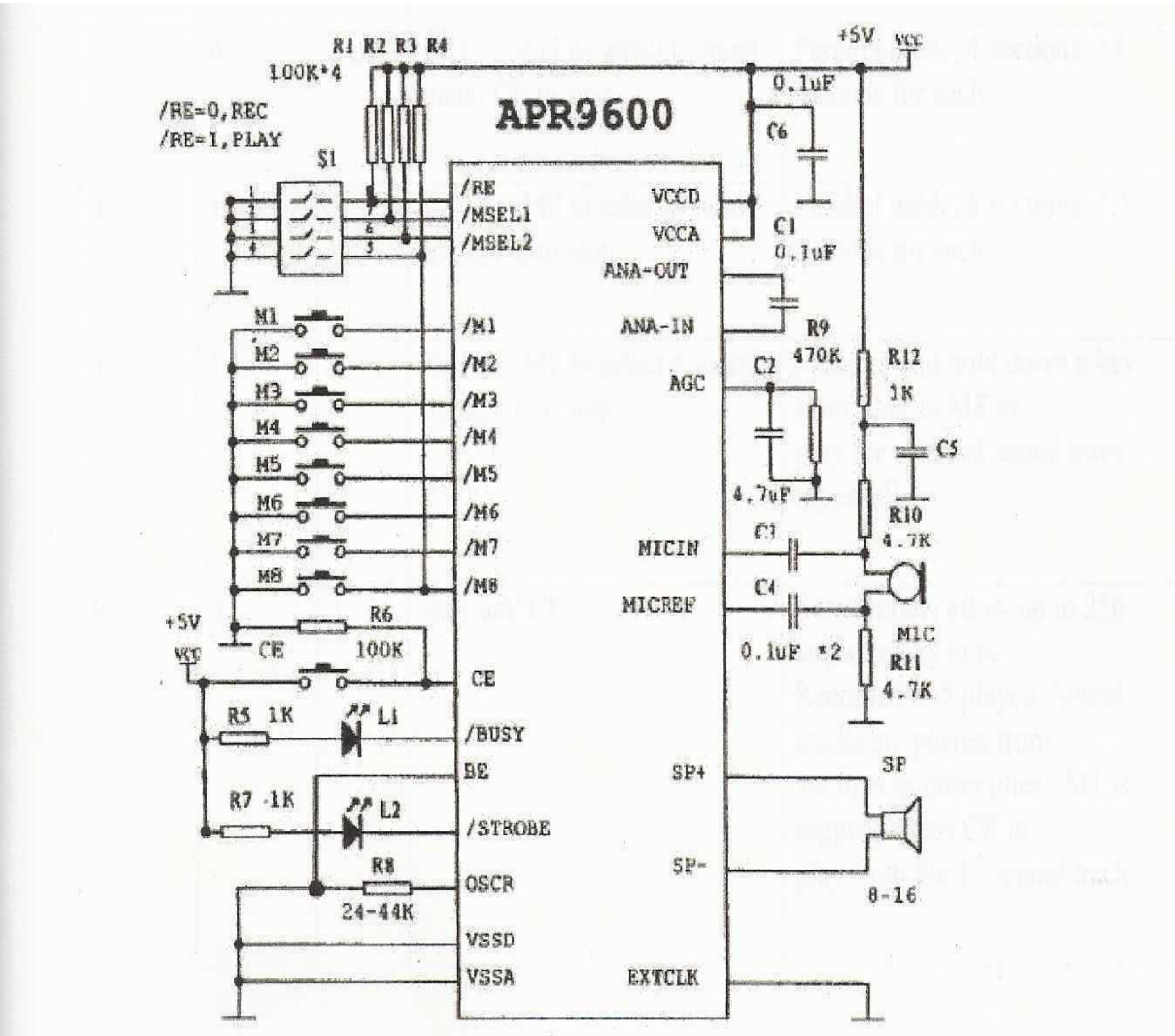
anticlockwise. If, however, the display gives spurious readings, like 128, 256 or 512, the sensitivity is too high: the meter then detects its own clock. This is an obviate by turning P3 slightly clockwise direction. If the unit in noisy surroundings, reduce its sensitivity even further, so that it does not respond to spurious sounds. Note, however, that the maximum measurable distance is then reduced. It should be borne in mind that absorbent surfaces, such as furniture dressed people, and so on cannot, or at least not reliably, be detected. This is because the echo from them is too weak to trigger the receiver. It pays, however, to experiments. For instance, the sensitivity of the receiver may be increased by reducing the value of R6. Furthermore time dependency of the sensitivity may be altered by changing the value of the constant R6-C8. Reducing that value makes the meter more sensitive over short distances.

4.3 Typical Connection of APR and Mode selection:



4.3.1 Mode Selection:

- RE = 0 to ground sound.RE = 1 to reply sound.
- Press M1 to M8 once to replay a sound track. Press the key again to stop replaying the track.
- Press and hold M1 to M8 continuously, the corresponding track will be replayed repeatedly.
- During recording, M1 to M8 should be pressed while the sound is being recorded.
- The key terminates recording.

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MSEL1	MSEL2	M8	Function Keys	Function
0	1	0 or 1	M1, M2 to select 1st and 2nd. Sound tracks to stop	Parallel mode,2 sections ,30 seconds for each
1	0	0 or 1	M1 to M4 to select a sound track, CE to stop	Parallel mode,4 sections,15 seconds for each
1	1	1	M1 to M8 to select a sound track, CE to stop	Parallel mode, 8 sections, 7.5 seconds for each
1	1	1	M1 to M8 to select a sound track, CE to stop	Pressing and hold down a key from M1 to M8 to play the selected sound track repeatedly.
0	0	1	M1 and CE	Serial mode, allow up to256 sound tracks to be recorded and played. Sound tracks are played from 1st to Nin order after M1 is toggled. Press CE to play from 1st sound track

Table 4.1: Modes and selection of modes of APR 9600.

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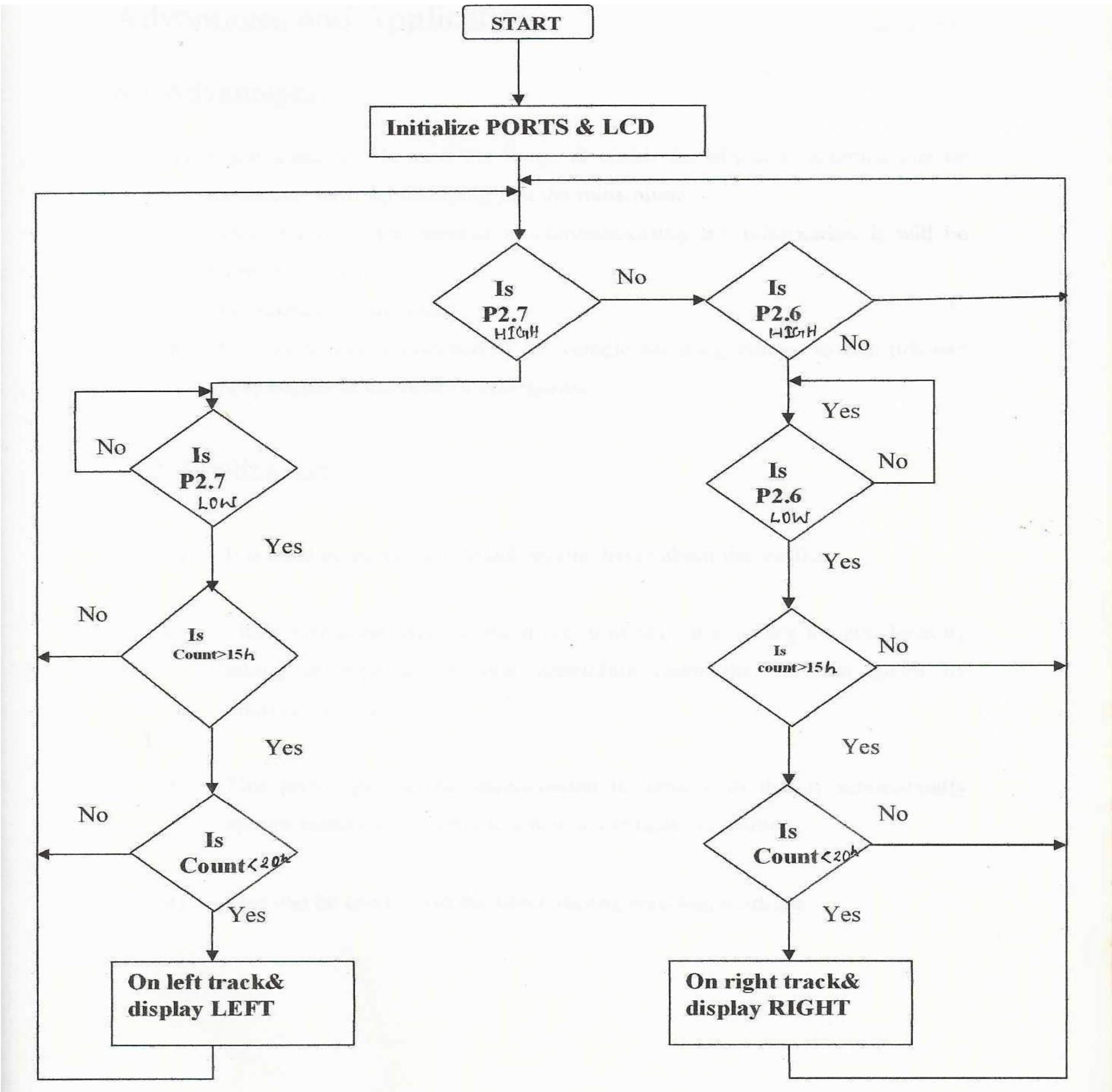
V. FLOWCHART



VI. ADVANTAGES AND APPLICATIONS

6.1 Advantages:

1) Since ultrasonic is used the range at which the object is detected can be increased easily by changing just the transmitter.
2) Since it uses voice method of communicating the information it will be more effective.
3) The hardware cost is less.
4) This can be easily installed to the vehicle breaking system so that this can apply brakes at the time of emergency.

6.2 Applications:

1) It is used in the vehicle to inform the driver about the traffic.

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2) The information given to the driver will help in avoiding the accident by taking appropriate decision depending upon the decision given by microcontroller.
3) This appropriate can be implemented to vehicle so that it automatically applies brakes to the vehicle when an obstacle is detected.
4) This can be used to aid the blind, during walking or working.

VII. RESULTS AND CONCLUSION

We have designed a system that will effectively determine any object in the path. But the detection of the object will be more precise if the object is within the range of 21cm and 31cm.
But, here the system is very sensitive to the noise, atmospheric condition etc. But at times there might arise a situation where the vehicle come from both sides, but here since we are using only processor it takes time from shifting control from one side to another.
Finally, we conclude our project by saying that this system works effectively under specific conditions. Thus there is a need of betterment. Instead of microcontroller the DSP Processors can be used which can speed up the calculation and processing time. And then it would be better if this prototype is made to apply brakes automatically if the situation goes beyond the driver’s control. For this to work properly the other vehicle must have this facility. Otherwise he might come across the accident.

VIII. FUTURE SCOPE

Nowadays, the govement and other organizations are spending more money to prevent accidents. This means of informing the driver both audibly and visually would prevent the accident to certain extent. This can be further modified so that we can interface this system with the accelerator of the vehicle and the vehicle itself automatically apply brakes during the time of emergency. This in turn makes the driving fully automatic with little human intervention. This type of technology has been implemented to cars using DSP Processors (TMS 320C50) or ultrasonic sounds.

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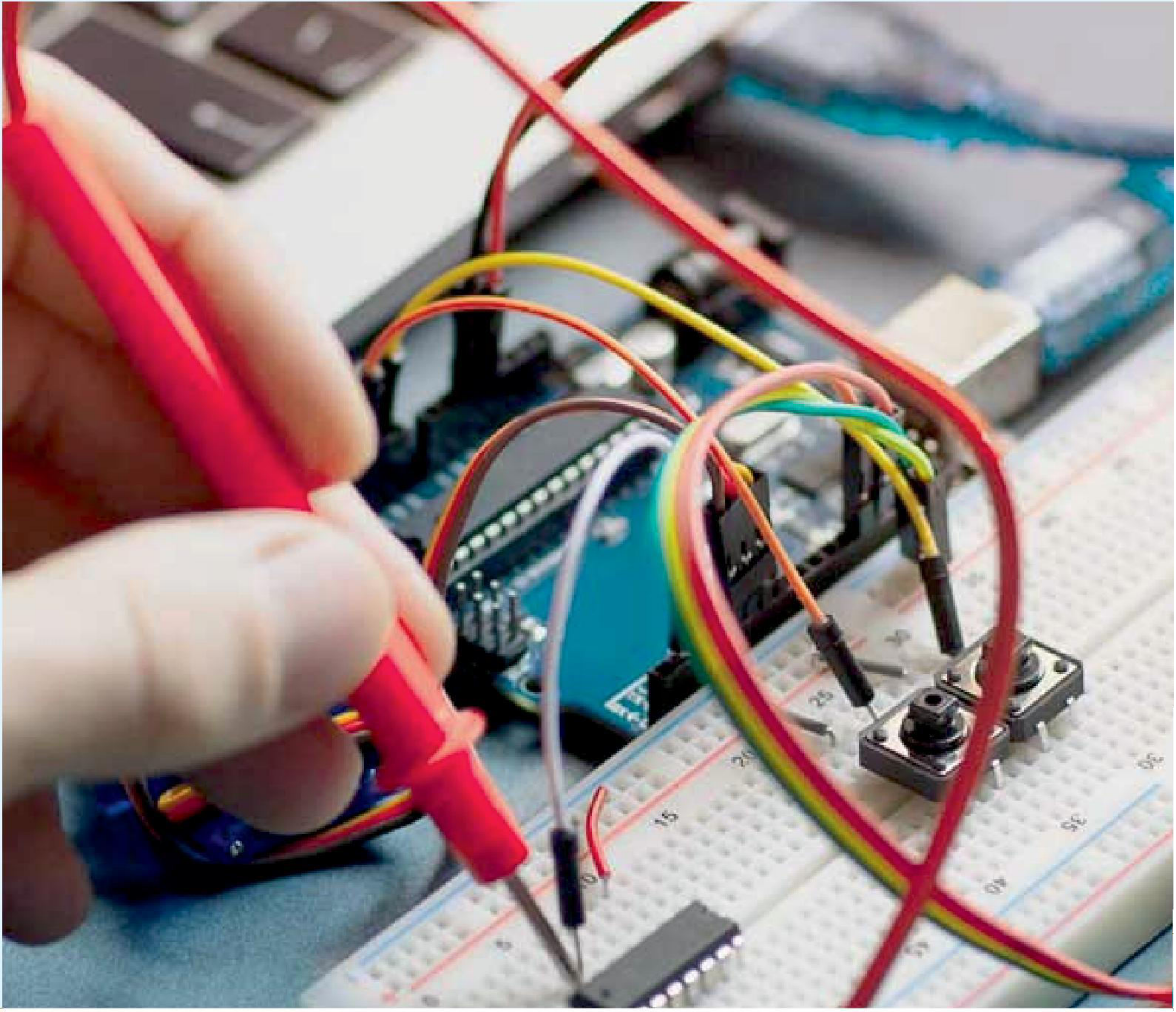

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